

geg:  $s = \frac{1}{2} a t_{fall}^2$ ;  $v_{schall} = \frac{s}{t_{schall}} = 330 \frac{m}{s}$ ;  $t_g = t_{fall} + t_{schall} = 4,3s$

$$a = 9,81 \frac{m}{s^2}$$

ges:  $s = ?$

Rechnung:  $v_{schall} t_{schall} = s$

$$s = \frac{1}{2} a t_{fall}^2 = v_{schall} t_{schall} \quad ; \quad t_{schall} = t_g - t_{fall}$$

$$\frac{1}{2} a t_{fall}^2 = v_{schall} (t_g - t_{fall})$$

$$\frac{1}{2} a t_{fall}^2 - v_{schall} (t_g - t_{fall}) = 0$$

$$\frac{1}{2} a t_{fall}^2 + v_{schall} t_{fall} - v_{schall} t_g = 0$$

$$t_{fall}^2 + \frac{2}{a} v_{schall} t_{fall} - \frac{2}{a} v_{schall} t_g = 0 \quad ; \text{ pq-Formel}$$

$$t_{fall} = -\frac{v_{schall}}{a} \pm \sqrt{\left(\frac{v_{schall}}{a}\right)^2 + \frac{2}{a} v_{schall} t_g}$$

$$t_{fall} = 4,06s$$

$$s = \frac{1}{2} a t_{fall}^2 = 80,8m$$